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A TELESCOPIC SPRAY EXTENSION ROD FOR USE IN BARK BEETLE CONTROL WORK

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As the life of a tree successfully attacked by bark beetles can not be preserved, control measures are directed toward the destruction of the insect broods beneath the bark to prevent their emergence and subsequent attack of other trees. One method of control now practiced for the treatment of lodgepole pine infested by the mountain pine beetle (Dendroctonus monticolae Hopk.) is to spray an inflammable oil upon the infested portion of the bole, which is then burned. Recent developments indicate the effectiveness of a penetrating spray which will destroy the insect broods beneath the bark without the use of fire. With either method it is necessary to spray the bole to the height of infestation, which ranges from 20 to 40 feet, depending somewhat upon the size of the tree.

The equipment employed in applying these sprays consists of a small compressed-air sprayer (fig. 1), a special straight-bore nozzle with an aperture of 0.052 of an inch which throws a fine, solid stream, and a number of 36-inch light steel extensions. As without extensions the oil or spray can be thrown only to a height of 23 to 25 feet, they are necessary in order that the desired height may be reached. During control operations one 36-inch extension usually becomes a permanent part of the equipment, as it affords that much additional height and in no way inconveniences the operator while he is treating the lower portion of the tree. To avoid the inconvenience and delay associated with the addition or removal of further extensions to effect the necessary treatment of tall trees, a telescopic extension has been developed at the Forest Insect Field Laboratory, Coeur d'Alene, Idaho, which greatly facilitates the application of either the penetrating spray or the oil for subsequent burning.

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This extension when contracted is only 5 feet in length (fig. 1) and can be extended (fig. 2) to a maximum of 13 feet 10 inches. In its construction three 5-foot lengths of 17-gauge steel tubing were used. The outside diameters of this material were 0.375, 0.500, and 0.625 of an inch, with inside diameters of 0.259, 0.384, and 0.509 of an inch, respectively. In telescoping these three tubes (fig. 3) the difference in diameter provided a clearance of 0.009 of an inch. Although this small clearance between the telescope tubes seemed sufficient, it is possible that it should be increased to 0.012 of an inch to reduce the likelihood of jamming in the event of slight denting. Possibly a lighter gauge tubing might be used, especially for the telescoped sections. The present equipment weighs 4 pounds 8 ounces and is difficult to hold when fully extended.

In constructing the sliding joints of this extension it was necessary that they be free of movement and still remain leak proof under a pressure of 30 pounds. The details of the sliding-joint construction are shown (fig. 4) in the telescoping of the upper pipe section C within the middle section B, with a clearance of 0.009 of an inch. The basal portion of the extension carries section B, with the same joint assembly as shown for the two upper sections. The basal section is attached to the pressure tank with a short length of hose (fig. 1). A $3\frac{1}{2}$-inch sleeve O is soldered to the end of pipe B and is threaded to receive the cap D. This sleeve, which protrudes over the end of pipe B, provides a stuffing box E for the graphite string packing F, which is wrapped around pipe C to prevent leakage. Two collars G and H are cut from pipe C and used in the stuffing box as indicated. Collar G is approximately three-fourths of an inch in length and is placed under the cap D to compress packing F. Collar H is one-fourth of an inch in length and is placed at the bottom of the stuffing box to act as a bumper for the two spring strips I, which are cut in pipe C to prevent the extension from being pulled apart. The mouth of pipe B is beveled inside to permit the spring strips I to strike the collar H. These spring strips are cut about 2 inches from the basal end of pipe C and are approximately one-fourth of an inch wide and $1\frac{1}{4}$ inches long. They are made by drilling two small holes through the pipe, then sawing between the two holes and down the sides and bending the strip outward. When pipe C is inserted in pipe B, these strips are compressed, but when the beveled or expanded end of the larger pipe is encountered they spring outward to strike against collar H. The packing F gives sufficiently to prevent excessive wear on the ends of the spring strips. A threaded bushing J is attached to the outer end of the extension to provide for the nozzle. A small hook is attached to the end of pipe C, which can be caught over a limb or in the bark in order to lengthen or contract the extension.

Explanation of Illustrations

Figure 1.--Small compressed-air sprayer equipped with a telescopic extension rod (contracted).

Figure 2.--Telescopic extension rod fully extended.

Figure 3.--Exterior view of the sliding joints of the telescopic extension rod.

Figure 4.--Diagram showing details of construction of the telescopic extension rod.

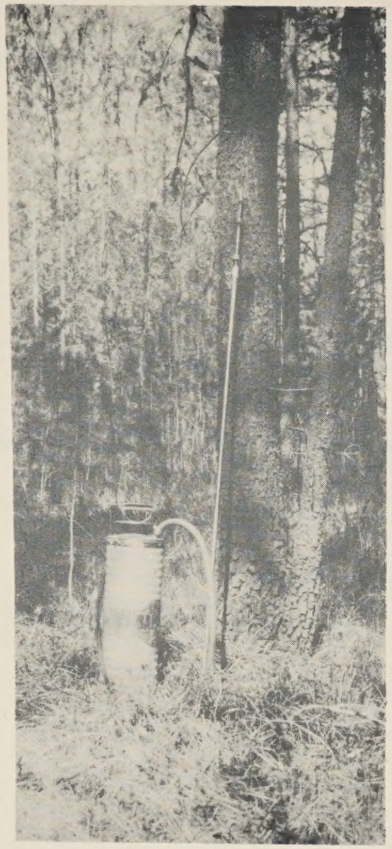


Figure 1

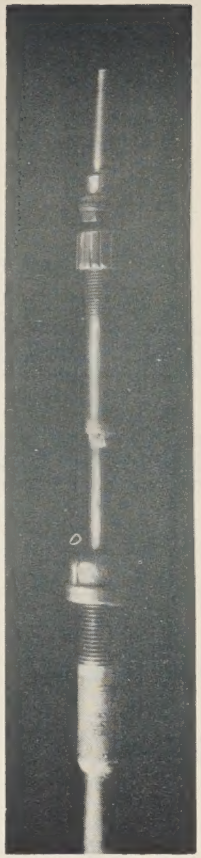
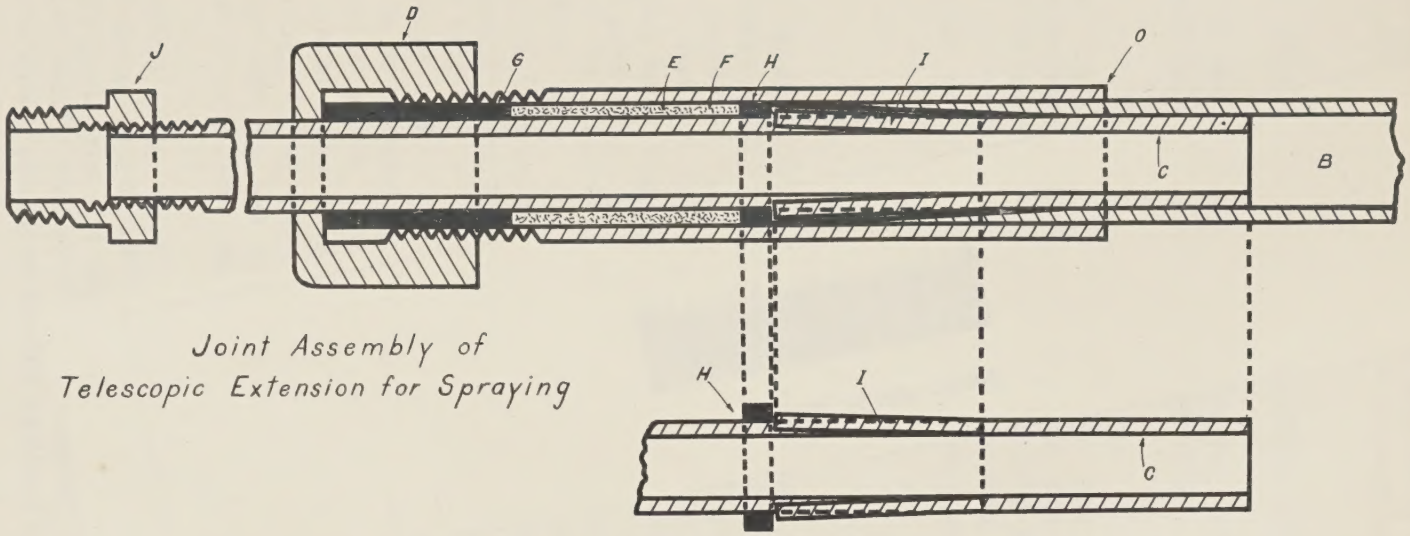


Figure 3

Figure 2



Joint Assembly of
Telescopic Extension for Spraying

FIGURE 4